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TARGET AUDIENCE: Engineering, Ops and Environmental Flights

Hydraulic Modeling of USAF Drinking Water Systems

Synopsis

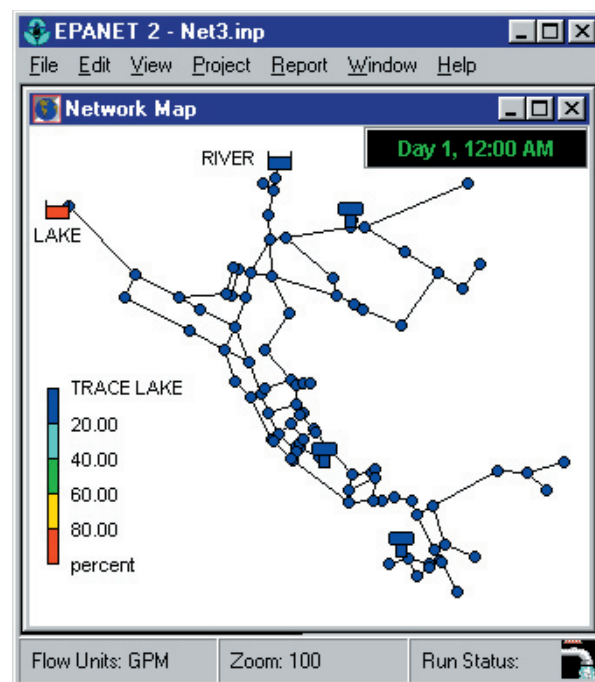
A hydraulic model of your potable water distribution system can be a valuable management tool for evaluating potential system improvements and simulating emergency scenarios.

Benefits of Hydraulic Modeling

Hydraulic models can be used in the project design phase to compare various water system improvement options; optimize conceptual planning; and identify critical junctions, failure points, low-pressure zones, etc. Operation of the water system can be enhanced by preparing unidirectional flushing plans based on modeled flushing actions. (For more info on unidirectional flushing, see A-GRAM 02-22, Sep 2002.) For most medium or larger systems, modeling is crucial to ensure that flushing meets its objective. Hydraulic models with water quality capabilities can be used in Anti-Terrorism/Force Protection (AT/FP) efforts to simulate intentional contamination acts. Water quality modeling can also be completed to estimate chlorine residual degradation and other Safe Drinking Water Act water quality parameters within the distribution system.

Selecting the Software for Your Location

Many of the commercial hydraulic modeling software being marketed are enhanced versions of EPANet 2.0, which can be downloaded free from the EPA Web site (<http://www.epa.gov/ORD/NRMRL/wswrd/epanet.html>). While some commercial models are GIS compatible (including GEOBase), you need to carefully research what they mean by "compatible." Sometimes compatible means the software can export files in a format that GIS systems can read, while other models are truly integrated into the GIS software and databases. If you are having a contractor develop your model as a part of a water system study or plan, and don't plan to actively use it on a daily basis, you should consider having the model files delivered in the EPANet format. Many of the licenses for these commercial hydraulic models cost several thousand dollars, and many have fees for annual updates, so it makes little sense to purchase the software if you won't use it on a regular basis. However, if you plan to actively use your model on a day-to-day basis, including updating the model with in-house personnel, integrating it with GEOBase or another GIS system, or integrating it with your SCADA system, you might want to consider a commercial model due to some of the feature limitations and the lack of technical support with the free EPANet software.



EPANet screen shot (courtesy EPA)

Model Calibration

Hydraulic models must be calibrated by comparing actual hydrant flows under specified conditions to flows predicted by the model. Models that are not calibrated may be inaccurate or provide misleading information, and could be of limited value.